

Remarks

Claims 1-30 are pending in the application. Claims 20-24 and 28-30 are allowed, for which action the Applicants thank the Examiner. Claims 3-11, 16, 18, and 26 are objected to as being dependent upon rejected base claims. Claims 1, 2, 12-15, 17, 19, 25, and 27 are rejected under 35 U.S.C. § 103 as being unpatentable over various combinations of prior art, as described in more detail below.

As discussed between the Examiner and Rick Barnes, attorney for Applicants, during their telephone conference of June 25, 1996, Claims 3-11, 16, 18, and 26 have been amended herein so as to not depend from rejected base claims, and based on the conversation with the Examiner, they are believed to be allowable. The description of the anti-aliasing filter as a fixed frequency analog filter has not been included in these claims, also as discussed with the Examiner, but has been placed in new dependant claims. New Claims 31-42 have been added. The amendments and following remarks are believed to be sufficient to overcome the objections and rejections. Reconsideration is requested.

Claims 1, 12-15, and 19 are rejected under 35 U.S.C. § 103 as being unpatentable over Nichol et al. Claims 1 and 12 are rejected under 35 U.S.C. § 103 as being unpatentable over Canada et al. Claims 2, 25, and 27 are rejected under 35 U.S.C. § 103 as being unpatentable over Canada et al. in view of Witte. Claims 2, 17, 25, and 27 are rejected under 35 U.S.C. § 103 as being unpatentable over Nichol et al. in view of Witte.

As discussed with the Examiner, Nichol et al. teaches the use of a switchable filter (Fig. 5) which provides selectable frequency filtering of analog signals (column 5, lines 24-25, and column 6, lines 10-17). The filter is a digitally set analog filter, having variable frequency limits, and so the analog signal can be subjected to differing upper cutoff frequencies. The apparatus of Nichol et al., therefore, requires that the low-pass filtering be accomplished at different frequencies. Canada et al. teaches the use of an analog switch capacitive filter having cut-off frequencies which are computer controlled (column 4, lines 36-38, and column 7, lines 36-46). Therefore, the

apparatus of Canada et al. requires that the low-pass filtering be accomplished at different frequencies. Witte teaches the use of a bank of two analog filters (Figs. 1 and 2) which provide for filtering the analog signal at two different frequencies (column 3, lines 31-32). Further, Witte teaches away from low-pass filtering at a single fixed analog frequency, as embodied in Claim 2 of the application (column 1, line 29-59). Thus, Nichol et al., Canada et al., and Witte all teach away from the present invention.

Claim 1 as amended claims a fixed frequency anti-aliasing filter through which the signal always passes, rather than a variable filter or banks of filters, and as discussed with the Examiner, should be allowable. Reconsideration is requested.

Claims 2, 12-15, 17, and 19 depend from independent Claim 1, and contain additional important aspects of the invention, and should be allowable. Reconsideration is requested.

Claim 25 does not claim any analog filter at all, but claims hardware for digitally low-pass filtering and digitally decimating the digital signal. As discussed above, Canada et al. and Witte both teach the use of more than one analog filter, or a variable frequency analog filter, which operates on the analog signal prior to converting the analog signal to a digital filter (in addition to the cites above, see Witte Figs. 1 and 2).

Thus Claim 25 embodies a departure from the teachings of the prior art, in that the analog signal is not low-pass filtered at all prior to conversion to a digital signal. An apparatus according to Claim 25 must rely on digital low-pass filtering and decimation to deal with aliasing problems, and it is not obvious, or even suggested by the references that a hand held vibration monitoring system could be so constructed. Therefore, Claim 25 defines over the prior art, and applicants assert that the rejection is improper, and request that it be withdrawn. Reconsideration is requested.

Claim 27 depends from independent Claim 25, and contains additional important aspects of the invention, also distinct from the teachings of Canada et al. in view of Witte, as explained above. Therefore, applicants assert that the rejection to this claim is likewise improper, and request that it be withdrawn. Reconsideration is

requested.

Applicants have reviewed the prior art made of record and not relied upon, and believe that the present invention as claimed defines over such for the same reasons as described in detail above.

New Claim 31 claims a multiple order sigma delta modulator, as discussed with the Examiner during the telephone conference of June 25, 1996. New Claim 32 depends from Claim 1, and is similar to Claim 2. New Claims 33-42 depend from Claims 3-11 and 31, respectively, and further describe the anti-aliasing filter as a fixed frequency analog anti-aliasing filter.

Filed herewith is a Supplemental Disclosure Statement, containing references which describe the "Data Trap" instrument by Beta Monitors & Controls Ltd. The Data Trap is an example of an early vibration collector that produced a single number representing an overall vibration level. It also had an option to record a time domain sample of the vibration signal, and is believed to include a single low pass filter through which the input vibration signal was applied. As such, the Data Trap is not an analyzer as required by Claim 1 of the application. It does not include a transformer for selectively operating on a digital signal, performing a Fast Fourier Transform, and producing a frequency spectrum from the digital signal, all as required by Claim 1. Furthermore, the Data Trap does not include a selector for selectively producing select data for storage from at least one of the digital signal and the frequency spectrum, as also required by Claim 1.

All known analyzers capable of performing a Fast Fourier Transform used some type of variable input frequency control, such as a variable filter or a bank of filters. In these designs, the variable input frequency control was necessitated by the frequency domain analysis that was performed by the analyzer, usually an FFT. Given the different functions being performed by known prior art analyzers and the Data Trap, there would be no suggestion to combine the teachings of the two types of devices to produce the structure set forth in Claim 1. In particular, there is no teaching that a fixed filter would be useful in the input section of an analyzer that performed Fast Fourier Transform analysis of vibration data.

The remaining claims readily define over the Data Trap and no discussion is believed necessary. Allowance of all claims is requested.

The copies of the references provided are from the attorney's files. Both the Applicants' files and the attorney's files were searched for the references, but these were the best copies that could be found. Applicants apologize that better copies of the references could not be provided to the Examiner.

Having thus responded to each point raised in the Office Action, Applicants believe that the application is now fully in condition for allowance. Reconsideration and such action is, therefore, respectfully requested.

Sincerely,

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I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington DC 20231, on the date below.

8/12/96
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